

## Application of Epidemiology in Community Oriented Primary Care

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### Synopsis .....

*Community oriented primary care (COPC) is the integrated practice of primary health care and community medicine, bringing together the care of individuals and the care of the community and its subgroups. Epidemiology plays an indispensable role in COPC. The*

*specific features of epidemiology as it is applied in COPC include its pragmatic purpose, its locale, its content, its scale, its specific relevance to the community health programs of the practice, and its clinical setting. The functions of epidemiology in the phases of program development are in the appraisal of needs and priorities, in community diagnosis and health surveillance, in the formulation of objectives and targets, in the choice of strategies and the identification of target groups, and in the implementation, monitoring, and evaluation of programs—as well as in the stimulation of community involvement and as an aid to the clinical management of individual patients.*

*Teaching the epidemiologic skills that are required for COPC necessitates exposure to an epidemiology curriculum which deals with these features and to a COPC practice. An urgent need exists to develop units that will practice, teach, and demonstrate COPC—units in which practitioners, teachers, and students can gain experience and develop, test, and evaluate approaches to the provision of COPC.*

COMMUNITY ORIENTED PRIMARY care (COPC) is a form of integrated practice of primary care that combines two elements: the care of individuals and families in the community and a focus on the community and its subgroups when services are planned, provided, and evaluated (1-4). An essential feature of COPC is the development of defined community health programs, within the framework of primary care, to deal with the health problems of the community or its subgroups, as determined by epidemiologic appraisal. In this paper, I define "community" as the aggregation of people for whose health care a specific primary care practice is or feels responsible, whether they are a true community in the sociological sense or not (3).

There is increasing awareness of the potential of COPC for improving the health of populations in both developing and developed countries. This awareness accords with the emphasis laid by the World Health Organization on the role of primary health care in improving health worldwide, and with the community orientation given to the concept of primary health care at the Alma-Ata conference in 1978 (5). Participants in recent symposiums describe the use of COPC in various settings (6-9) and provide evidence of its effectiveness. The effects of pro-

grams operated by the Hadassah Community Health Center in Kiryat Yovel, Jerusalem, an agency that has demonstrated and taught COPC since the 1960s (1-4), include considerable reductions in anemia of pregnancy (2) and in the prevalence of hypertension, smoking, and other cardiovascular risk factors (10), narrowing the gap in development between privileged and underprivileged infants (11), and increased use of family planning (1). Recent interest in the furtherance of COPC in the United States (12-14) found expression in a conference held under the auspices of the Institute of Medicine of the National Academy of Sciences in 1982 to review current thinking and experience and consider ways of facilitating the development of this form of practice (8) and in the subsequent appointment by the Institute of a committee to assemble and assess data on COPC. This committee has now recommended that substantial support be made available for the development of COPC in a variety of clinical settings in the United States in order to permit rigorous tests of impact on health and cost and that a major effort be made to develop and test methods for the performance of COPC functions (15).

Epidemiology plays an indispensable role in COPC. In this paper I will attempt first to map the characteristics

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of the epidemiology used in COPC, and then I will briefly consider implications for the teaching of the epidemiologic skills that COPC requires.

### Special Features

In delineating the specific features of epidemiology as it is applied in COPC, I will pay attention to its purpose, locale, content, scale, specificity, and clinical setting, and to its functions in different phases of developing COPC programs.

**Purpose.** The epidemiology used in COPC is pragmatic; it is motivated by a concern with the welfare of the community that is cared for. It is not aimed primarily at adding to our knowledge of how health and disease are determined and how they can be influenced, or at yielding generalizable inferences of other kinds. Information is collected and analyzed to help the specific community, just as in clinical practice a patient is examined and a diagnosis is made for his own benefit.

Nevertheless, COPC also offers important opportunities for research on the etiology, natural history, prevention, and care of common disorders, processes of growth and development, and the effects of family functioning and of social supports and pressures on health and health care. Such research should be encouraged. In particular, evaluative research on COPC itself is urgently needed to provide generalizable conclusions about the effectiveness and efficiency of specific kinds of health programs in different communities and health care contexts.

Primarily, however, the purpose of epidemiology in COPC is to benefit a particular community. Epidemiologic studies that are not directed, or not also directed, toward this purpose cannot meet the needs of COPC, however valuable the lessons they may yield. Unfortunately, many academic epidemiologists find this kind of action-oriented epidemiology unstimulating; de-

spite its essential role in COPC, its findings may have little general interest and hence a low publishability quotient.

**Locale.** COPC requires epidemiologic studies conducted in the community served by the practice. Broader surveys, such as national or regional ones, can of course contribute to community oriented primary care. By identifying areas or subpopulations that have especially urgent needs—rural areas, poor communities, and specific ethnic groups—such surveys would, in a logical world, provide a basis for the allocation of primary care resources. In real life, such facts too seldom influence resource allocation. More realistically, surveys of large populations or samples—even those that do not differentiate between specific communities—may help COPC practitioners to select problems meriting special attention. This assumes, of course, that the findings of the broad study are applicable to the specific community, which is not always true. In various neighborhoods within a 5-mile radius in central Israel, for example, infant mortality rates ranged from 9.9 to 26.3 per 1,000; the rate for the total region was 14.5 per 1,000 (16, 17). Local surveys may be indispensable for the assessment of health problems in a specific community (18).

Moreover, the identification of priorities is not the only function that epidemiologic studies fulfill in COPC. They have other important functions, and these usually require studies in the specific community.

**Content.** Epidemiologic studies in COPC may deal with any health topic relevant to the concerns of the practitioners and the community. Generally, studies are of common problems, their causes, and treatment; obviously, these studies do not deal with rare disorders seldom encountered in primary care practice.

The scope of possible topics can be as broad as the interests of the practitioners. It will be narrow if the practitioners are concerned solely with the care of the sick, and wide if they have a comprehensive approach conforming with the Alma-Ata conference's broad definition, "primary health care addresses the main health problems in the community, providing promotive, preventive, curative and rehabilitative services . . ." (5).

Possible topics are diseases, disabilities, and other disorders; growth and development; somatic and psychological characteristics; behavioral, social, cultural, demographic, and environmental factors that may influence health or health care; and the effects of ill health. The monitoring and evaluation of health care itself can also be regarded as essentially epidemiologic activities (1,19).

**Scale.** The scale of epidemiologic studies in COPC depends on the size of the community served. If this

population is too small to provide clear answers to certain questions that interest practitioners, it is often necessary to accumulate data over a long period in order to meet these requirements. The scale of studies is also restricted by practical considerations. Unless additional resources are available, practical constraints ordinarily preclude large studies.

**Specificity.** In the reality of the primary care situation, available resources will seldom permit large or elaborate epidemiologic investigations; selectivity is essential. A characteristic feature of epidemiology in COPC, therefore, is that it is custom-made. Although, as stated previously, the range of possible topics may be wide, detailed studies are generally limited to specific problems that have been chosen for special attention. Epidemiologic activities are geared to these specific problems and to the specific health programs planned or developed to deal with them.

Although a case can be made for the routine collection of certain standard data in all primary care practices or in all primary care practices of a certain kind or in a certain country, it may not be practicable for this data set to be extensive. Obtaining information that is detailed and accurate enough to be helpful in the planning, implementation, monitoring, and evaluation of a community health program is not easy. It is therefore usually necessary to be selective in the collection of data, laying stress on the information with an obvious relevance to the existing or contemplated programs.

**The clinical setting.** A specific feature of epidemiologic activities in COPC is that much of the data is usually collected in the course of clinical care, either as part of the diagnostic investigation and surveillance of patients or by using questions and tests specially added to clinical routines for epidemiologic purposes. The same item of information generally serves both clinical and epidemiologic purposes. Special efforts may be required to obtain similar information from people who have not attended on their own initiative, so as to complete the community picture, and sometimes special community health surveys are conducted. In such surveys, too, the results may be applied at the individual as well as at the community level. In these surveys, one implication of the practitioner's double responsibility—to individual patients and to the total community—is that the use of sampling is often inappropriate. A survey of a community sample may provide prevalence rates, but it cannot identify everyone who needs care.

The clinical context of COPC brings obvious advantages. It facilitates the acquisition of information, especially if this requires elaborate tests, questions about delicate matters, or long-term followup. It also has disad-

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vantages. Rigorously standardized procedures and criteria—essential for epidemiologic purposes—are not easy to introduce, monitor, or maintain in the context of ordinary clinical care. Ongoing quality control may be needed. Also, special records and record systems are usually required. Moreover, strong possibilities of both selection bias and information bias are inherent in the clinical setting (20). In evaluative studies in particular, special precautions are needed to reduce bias by the use of objective measures and, when necessary, by obtaining the help of independent observers or investigators.

**Functions.** Like other forms of health care, COPC is developed in accordance with a cybernetic planning cycle (19); this cycle comprises preliminary steps, community health diagnosis, the planning of intervention, program implementation, surveillance and evaluation, and decision-making for future action (3). The specific functions of epidemiology vary in different phases of this cycle. (For illustrations drawn from actual programs, see references 3, 16, and 21.)

In the preliminary stage, epidemiologic data concerning the nature, extent, and impact of various disorders and health hazards enable COPC practitioners to appraise the relative importance of different problems. These data provide a basis for decisions on priorities—what problems deserve detailed study and possible action? Information that is easily available may be used; for example, the practice's records on reasons for attendance or causes of hospitalization or studies conducted in other or broader populations, if the findings can be applied to the COPC population.

In the stage of community diagnosis, more detailed epidemiologic studies of selected health problems and their determinants provide foundations for the planning of intervention and a baseline for the subsequent measurement of change. The kinds of questions that may be asked are: "What is the prevalence rate of hypertension? How common are complications? How strong is the association with obesity? How many hypertensives smoke cigarettes, or have other risk factors for coronary heart disease? What proportion of the community has been screened for hypertension? How many of the known hypertensives are under treatment? How many are under control?" (20). It is obvious that no national survey can

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provide such information about a specific local community.

The stage of community diagnosis merges into ongoing surveillance of the population's health status, which continues the diagnostic process and keeps it up to date. When study objectives necessitate the long-term accumulation of data or the use of longitudinal methods—for example, to estimate whether and by how much a raised blood pressure or serum cholesterol value increases the risk of death in this community—community diagnosis and surveillance may be indistinguishable.

Once it has been decided that a specific program should be planned, epidemiologic data provide foundations for the formulation of objectives and specific targets of the program, for the choice of strategies and procedures, and for the identification of groups on whom it may be worth concentrating efforts. These functions demand an analytic approach, aimed at identifying community syndromes (1), at demonstrating factors that create a problem in a particular community, at estimating long-term risk, and at picking out groups that are especially affected or at higher risk.

Epidemiologic activities may be of direct help when carrying out programs by contributing to case finding and to the establishment of registers (for example, of chronically ill patients or of people at high risk) that may be used in program management and monitoring. Ongoing health surveillance and monitoring of compliance, the performance of special tests, and other aspects of the process of care provide a basis for cybernetic corrections to the program.

Appraisal of the program's effectiveness, and decisions to continue or modify it, require further epidemiologic investigations. These investigations may center on measures of outcome, including both desirable and undesirable changes in health status and in factors that may affect health status, or on measurements of care procedures. Evaluative studies may be "program reviews," which aim solely at helping COPC practitioners make decisions, or they may be "program trials," designed to yield generalizable conclusions about the value of a program of the kind under consideration (22). The latter purpose may require experiments or quasi-experi-

ments using control groups (23), as well as various procedures that go beyond those that might normally be undertaken in the practice.

Apart from their specific contributions to the development of health programs, epidemiologic studies can also serve a different kind of function in COPC. Community participation in the promotion of health may be regarded as a basic element of this form of practice (2,5). Epidemiologic findings may be used to stimulate the community to become more actively involved. Participation of community members in the planning and conduct of field studies may serve the same purpose.

A further function, which should not be forgotten, is the contribution of epidemiology to the clinical care of individuals in the practice, without relation to community health programs. Clinical epidemiologists stress the role of epidemiologic findings as a basis for clinical judgments concerning diagnosis, treatment, and prognosis. In COPC, knowledge of the patient's own community—prevalence rates and common causes of diseases, growth norms, and other epidemiologic findings—may be especially helpful in case management.

### **Implications for Teaching**

All physicians, nurses, and other health workers engaged in COPC are likely to be involved in collecting epidemiologic data, and many will be expected to use epidemiologic findings. All prospective COPC practitioners should, therefore, have enough exposure to epidemiology to enable them to appreciate its importance and fulfill their functions. This requirement applies to all levels of personnel. A review of experience in 13 developing countries has demonstrated that community health workers, rural midwives, and other front-line health workers can be trained to use simple epidemiologic methods, and thus they are enabled to understand and solve local health problems (24).

COPC practitioners who will participate in or be responsible for the planning and management of epidemiologic activities, data analysis, and the planning of community health programs obviously require more intensive training. It is apparent from the preceding description of epidemiology, as it is applied in COPC, that exposure to a conventional epidemiology course is unlikely to suffice. As most textbooks demonstrate, emphasis is usually placed on the use of various study designs and procedures for the testing of hypotheses about the etiology of disease, but certainly not on applications to primary care. Most teachers of epidemiology are neither interested nor experienced in the use of their discipline for pragmatic purposes in a primary care setting.

Courses in clinical epidemiology, which are designed to meet the needs of clinicians, generally emphasize the

use of epidemiologic principles and findings as a basis for decisions on the care of individual patients, together with the elements of research, especially concerning the effects of care procedures, in the clinical situation. They do not, however, focus on the community.

Mullan has suggested the teaching of primary care epidemiology, which he defines as the "application of the approach of clinical epidemiology to primary care practice," with an added focus on community diagnosis and its use to modify the activities of the practice (25). My only criticism of this laudable suggestion is that there is a danger that, in the same way as most primary care lacks a community orientation, primary care epidemiology may also turn out to be not community oriented. I have elsewhere advocated broadening the scope of clinical epidemiology to meet the needs of COPC, and I have suggested that this would require a curriculum giving special attention to the uses of epidemiology in each phase of the COPC cycle, as well as to a number of specific issues. Among the issues are, for example, problems in the definition of the COPC population, methods of demographic surveillance, the design of primary care records and record systems, the identification of community health syndromes, and the use of quasi-experimental methods in program evaluation (26).

Whether this is called clinical epidemiology, primary care epidemiology, COPC epidemiology, or some other name is not important. What *is* important, as Mullan has emphasized, is that enough epidemiologists should become interested and sufficiently experienced in this application of epidemiology to teach it.

Even such courses, however, cannot be enough, without exposure to COPC itself. As yet, there are few opportunities for educational experiences in COPC (27,28). Although many "community oriented" programs are offered to medical students, this term usually has some meaning other than the integration of community medicine and primary care (29).

Additional COPC practices are urgently needed for teaching and demonstration purposes. Such practices can give practitioners, teachers, and students experience, and they permit the development, testing, and evaluation of different approaches to the provision of COPC.

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## Community-Oriented Primary Care: Epidemiology's Role in the Future of Primary Care

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COMMUNITY-ORIENTED PRIMARY CARE (COPC) is a concept pioneered in Israel that is receiving increasing attention in the United States. COPC is a development of enormous importance to this symposium because it demonstrates yet another area where the principles of epidemiology can be applied in biomedicine with important medical, scientific, and social results.

The experiences discussed in this paper are limited to those of the United States and Israel, two economically advanced nations with highly developed systems of medical care and abundant technological resources. The principles of COPC discussed, therefore, are set in the context of the Western medical model, with physicians and hospitals playing a central role in the delivery of health services. The basic construct of COPC, however, is equally germane to less developed nations where physicians and hospitals are rare and the improvement of health status depends primarily on village health workers and basic public health interventions. Although the international applications of COPC will not be addressed here, this aspect is important to both Israel and the United States in their roles as leaders in providing technical assistance to the developing world. COPC, in short, has policy relevance at home and abroad for the United States and Israel.

Although both nations have growing amounts of experience with the implementation of COPC, neither currently has an academic commitment to training primary care epidemiologists, the critical researchers and teachers who can help COPC realize its potential. After fully defining COPC I will discuss the concept of primary care epidemiology in an effort to stimulate further discussion.

### Community-Oriented Primary Care

Community-oriented primary care was proposed as a concept and first codified by Sidney Kark, based on his

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extensive work at Kiryat Yovel, a small, defined community in Jerusalem (1,2). Many principles explored by Kark are taught in the community-oriented curriculum of the medical school at Ben Gurion University of the Negev, Beersheva, Israel.

To the practice of good primary care medicine COPC adds the systematic use of clinically oriented epidemiology. The COPC practitioner does not simply treat patients as they arrive in the waiting room; rather, he or she defines a community of service and establishes a program to evaluate systematically the actual needs of that community. The data thus derived are used to orient both the activities of the practice itself and the outreach programs undertaken by its staff alone or with staff of other community agencies. The process is an ongoing one in which the practice systematically and periodically evaluates and reorients itself based on the needs of its population.

The basic principles of COPC can be summarized as follows:

1. Primary care: the practice of primary care, including the availability of a complete range of services and the geographic, financial, and cultural accessibility of the practice to the patient population.

2. Epidemiology: use of epidemiologic skills in conjunction with the clinical activities of the practice. The epidemiologic activities should take place both in the community (extramurally) and within the practice (intramurally).

3. Defined population: definition of the population for whom the practice is responsible. This group of people is the target population for primary care services and the denominator population for the measurement of health status, need, and outcome.

4. Defined programs: defined programs, which are based on the epidemiologic analysis, aimed so they deal